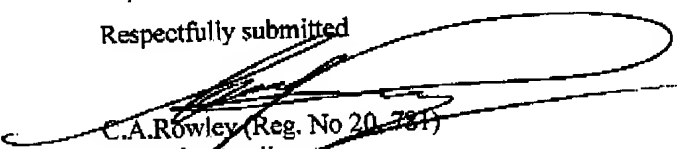


have been deleted without prejudice. These paragraphs were simply clarifying how the apparatus of the present invention might be used and are not part of the apparatus of the present invention. Claims with mainly process limitations have all been removed without prejudice leaving only the claims containing primarily apparatus limitations as requested in the Final Action. The Examiner has found that the subject matter of the claims distinguishes over the prior art and it is believed the above revisions overcome the formal objection to the application (disclosure and claims).

Applicant is not requesting that the claims to the non-elected species be reinstated even though at least one of the generic claims (1, 21-37, 44 and 45 as identified in the Office Action) is believed has been found to be patentable since these non elected species are primarily based on process limitations. Applicant reserves the right to file a Divisional application claiming the process of the present invention.

It is believed this application is now in condition for Allowance and such action is respectfully requested.

Respectfully submitted



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Certificate of Transmission

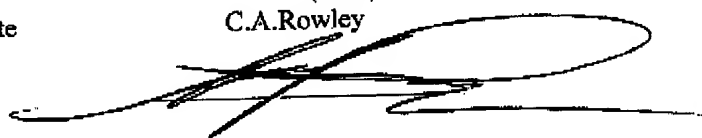
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In the Disclosure

Please amend the paragraph beginning on page 5 line 23 as follow delete the paragraph inserted by mistake in the July 18, 2002 amendment and correct the originally paragraph as follows

~~The distributor of the second fluidized bed 12 divides the incoming stream of extracting buffer 28 into two sub-streams: the primary 60 and the auxiliary 62 streams. The primary stream 60 is introduced through nozzle 30 which projects into the second fluidized bed column 12. This design increased the pressure drop across the bottom solids return pipe 42 and makes the system more stable. The auxiliary stream 62 is introduced into the bottom 26 of the second fluidized bed 12 through a perforated plate inlet 32. The function of the auxiliary stream 62 is to stir up the particles at the bottom of the second fluidized bed 12 to be entrained up second fluidized bed by the combination of the primary and auxiliary liquid streams 60 and 62. The two streams 60 and 62 may also be combined into a single stream and the fed through a single distributor at the second fluidized bed 12 bottom end 26.~~

In the LSCFB ion exchange system of the present invention, the solids circulation rate is controlled by a butterfly valve schematically indicated at 70 located on the bottom solids return pipe 42. The mechanical valve is preferred over a hydraulic valve due to the low density of most ion exchange particles, which makes the operation of the hydraulic valve more difficult. An additional advantage of using the mechanical valve in this situation is that it enhances the pressure drop across the solids return pipe 42 and therefore makes the system more stable. The auxiliary liquid stream 62 may be used to provide additional control of the solids circulation rate.

(To explain the above the new paragraph is the corresponding originally filed paragraph amended as follows

In the LSCFB ion exchange system of the present invention, the solids circulation rate is controlled by a butterfly valve schematically indicated at 70 located on the bottom solids return pipe 42. The mechanical valve is preferred over a hydraulic valve due to the low density of the most ion exchange particles, which makes the operation of the hydraulic valve more difficult. An additional advantage of using the mechanical valve in this situation is that it enhances the pressure drop across the solids return pipe 42 and therefore makes the system more stable. The auxiliary liquid stream 62 may 62 may be used to provide additional control of the solids circulation rate.)

Please delete the paragraph inserted after the paragraph ending on page 7 line 24 in the

amendment filed July 18, 2002 without prejudice

~~Although the invention has been illustrated with the feed liquor flowing upwards in countercurrent with the particles in the first fluidized bed and the extract buffer flowing upwards in cocurrent with the particles in the second fluidized bed, it will be clear to those skilled in the art that the two fluidizing fluids can be switched with the feed liquor flowing upwards in cocurrent with the particles in the second fluidized bed and the extract buffer flowing upwards in countercurrent with the particles in the first fluidized bed.~~

Please delete the paragraph inserted after the paragraph ending on page 8 line 30 in the amendment filed July 18, 2002 without prejudice

~~Although the above description uses the first fluidized bed for adsorption and the second fluidized bed for desorption, it will be understood by those skilled in the art that one can also use the second fluidized bed for adsorption and the first fluidized bed for desorption.~~

In the claims

Claim 1 has been amended as follows

1. (Amended twice) A liquid-solid circulating fluidized bed system comprising a first liquid fluidized bed, [said first liquid fluidized bed being a conventional liquid fluidized bed,] means to feed solids into said first fluidized bed adjacent to a first end of said first fluidized bed and means to feed a first fluid into said first fluidized bed adjacent to a second end of said first fluidized bed, said second end being remote from said first end so that said solids and said first fluid flow in counter current, a second liquid fluidized bed, said second liquid fluidized bed being an entraining liquid fluidized bed wherein a means for introducing solids and a means for introducing a second fluid into said second bed are both adjacent to one end of said second fluidized bed so that said solids and said second fluid introduced into said second bed flow concurrently through said second bed from said one end toward another end of said second fluidized bed remote from said one end, first means connecting said first fluidized bed to said second fluidized bed adjacent to said second end of said first fluidized bed and said one end of said second fluidized bed, said first connecting means includes means to feed said solids into said second fluidized bed, second means connecting said first and said second fluidized beds adjacent said first end of said first bed and said other end of said second fluidized bed, said first means connecting includes means forming a dynamic hydraulic seal between said first and second

fluidized beds and said second means connecting includes said means to feed solids into said first fluidized bed.

Please amend claims 22 and 23 as follows

22. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 21 wherein said first end of said first fluidized bed is the top end, said second end of said first fluidized bed is the bottom end, said one end of the second fluidized ~~beds~~ bed is the bottom end and said other end of said second fluidized bed is the top end.

23 (Amended) A liquid-solid circulating fluidized bed system as defined in claim 22 wherein said first fluid essentially flows upwards and said solids essentially flow downwards to form a counter current flow in said first fluidized bed, and wherein said second fluid and solids both essentially flow upwards concurrently in the second fluidized ~~beds~~ bed.

Please amend claim 28 as follows

28. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 27 wherein said first means connecting said first and said second liquid fluidized beds further includes a separator means for separating solids from fluid and exhausting such separated fluid to provide separated solids.

29. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 27 ~~1~~ wherein said first means connecting said first and said second fluidized beds further includes a hydraulic dynamic seal is a packed moving bed.

Please delete claims 30, 31, 32 and 33 without prejudice

Please amend claims 34 to 37 inclusive as follows

34. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 32 ~~1~~ wherein second means connecting said first and said second liquid fluidized beds includes a washer for washing said solids before they are fed into said first end of said first fluidized bed, a separator means for separating solids from fluid and exhausting such separated fluid to provide separated solids, and a hydraulic seal between said first and second fluidized beds.

35. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 33 ~~23~~ wherein second means connecting said first and said second liquid fluidized beds includes a washer for washing said solids before they are fed into said first end of said first fluidized bed, a separator means for separating solids from fluid and exhausting such separated fluid to provide separated solids, and a hydraulic seal between said first and second fluidized beds.

36 (Amended) A liquid-solid circulating fluidized bed system as defined in claim 32 ~~34~~

wherein said first means connecting said first and said liquid second fluidized beds includes a second washer for washing solids adjacent to said second end of said first fluidized before they are introduced into said second fluidized bed, a separator means for separating solids from fluid and exhausting such separated fluid to provide separated solids[, and a hydraulic seal between said first and second fluidized beds].

37. (Amended) A liquid-solid circulating fluidized bed system as defined in claim 33 35 wherein said first means connecting said first and said second liquid fluidized beds includes a second washer for washing solids adjacent to said second end of said first fluidized before they are introduced into said second fluidized bed, a separator means for separating solids from fluid and exhausting such separated fluid to provide separated solids[, and a hydraulic seal between said first and second fluidized beds].

Please delete claims 38 to 45 inclusive without prejudice